Supplemental Site Investigation Report

Avery Landing Site
Avery, Idaho

for
Potlatch Forest Holdings, Inc.

November 9, 2011

GeoEngineers
Earth Science + Technology

Supplemental Site Investigation Report

Avery Landing Site
Avery, Idaho

for
Potlatch Forest Holdings, Inc.

November 9, 2011

GeoEngineers

Plaza 600 Building
600 Stewart Street, Suite 1700
Seattle, Washington 98101
206.728.2674

Supplemental Site Investigation Report

Avery Landing Site
Avery, Idaho

File No. 2315-016-01

November 9, 2011

Prepared for:

Potlatch Forest Holdings, Inc.
530 South Asbury, Suite 4
Moscow, Idaho 83843

Attention: Terry Cundy, Manager

Prepared by:

GeoEngineers, Inc.
600 Stewart Street, Suite 1700
Seattle, Washington 98101
206.728.2674

Garrett R. Leque, LG
Geologist

Iain H. Wingard
Associate, Environmental Scientist

John M. Herzog, PhD
Principal

GRL:IHW:JMH:cn

GeoEngineers

Table of Contents

1.0 INTRODUCTION

This document presents the results of supplemental investigation activities performed at the Avery Landing Site (Site) located approximately 0.75 miles west of Avery, Idaho. The supplemental investigation was performed on September 19 through September 22, 2011 in general accordance with the Site Specific Sampling Plan (SSSP) and associated Quality Assurance Project Plan (QAPP) prepared specifically for the investigation (GeoEngineers, 2011a and 2011b). The supplemental investigation included the following activities:

1. Soil investigation consisting of test pit excavations and soil sampling and analysis to delineate two areas on the western portion of the Site where evidence of petroleum hydrocarbon product and/or sheen was observed during previous investigations.
2. Measurement of the depth-to-groundwater and evaluation of the presence of petroleum hydrocarbon contamination/product on groundwater in Site wells and other monitoring locations.
3. Decommissioning of a former domestic water supply well in accordance with applicable regulations.

The following sections present the Site background and the results of the supplemental investigation.

2.0 BACKGROUND

The Site is the former location of a railroad roundhouse and maintenance facility for the Chicago, Milwaukee, St. Paul, and Pacific Railroad (Milwaukee Railroad). Railroad operations at the Site ceased in the 1970s and the railroad facilities and structures were subsequently demolished.

The Site has been the subject of multiple environmental investigations. Petroleum hydrocarbons have been identified in Site soil and groundwater and sediment in the St. Joe River. Petroleum hydrocarbon sheen has also been observed in an area where groundwater seeps into the St. Joe River. Additionally, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), carcinogenic and non-carcinogenic polycyclic aromatic hydrocarbons (cPAHs and PAHs), polychlorinated biphenyls (PCBs), and metals have been detected in Site media in association with the petroleum hydrocarbon contamination. The results of investigations of the Site are presented in the draft Engineering Evaluation/Cost Analysis (EE/CA) report prepared by Golder and Associates (Golder, 2010) for Potlatch and draft final EE/CA report prepared by Ecology and Environment for EPA (E&E, 2010).

During previous investigations, petroleum hydrocarbon product and/or sheen were observed in soil in two discrete areas on the western portion of the Site. However, the extent of petroleum hydrocarbon contamination in soil in the two areas was not delineated during the previous investigations. One area is associated with previous investigation location TP-03 and the second area is associated with previous investigation locations TP-06 and GA-3 (Figure 1). As part of the current investigation, test pit excavation and soil sampling and analysis were performed to

delineate the extent of petroleum hydrocarbon-contaminated soil in the two areas to support evaluation of removal actions on the western portion of the Site.

Petroleum hydrocarbon product has been measured on groundwater in wells and other monitoring locations during multiple previous investigations of the Site. As part of the current investigation, measurements of the depth-to-groundwater and evaluation of the presence of petroleum hydrocarbon contamination and product on groundwater in Site wells, piezometers, and other monitoring locations was performed to provide a current assessment of the presence and extent of petroleum product on groundwater at the Site (Figure 1).

A well formerly used for domestic water supply was present on the western portion of the Site (Figure 1). As part of the current field activities, the former domestic water supply well was decommissioned in accordance with Idaho well construction standards.

3.0 SUMMARY OF FIELD INVESTIGATION ACTIVITIES

3.1. Test Pit Excavations

Previous investigation results that indicated that contamination may be located on the western portion of the Avery Landing Site also indicated that the contamination may be present on property owned by the Federal Highway Administration (FHA) as well as property owned by Potlatch. Test pit excavations and soil sampling and analysis were completed to further delineate the extent of petroleum hydrocarbon-contaminated soil in the western portion of the Site. Test pit activities performed as part of this investigation were performed on Potlatch property and not on the adjacent FHA-owned property. Supplemental investigation of contamination on property owned by the FHA is simultaneously being performed by the FHA.

Test pit excavations were performed on September 20 and 21, 2011 using a trackhoe excavator. Between nine and 12 test pits were proposed to be excavated as specified in SSSP (GeoEngineers, 2011a). Nine test pits were to be excavated initially around previous investigation locations TP-06 and GA-3 (i.e., five test pits) as well as TP-03 (i.e., four test pits) with additional test pits to be excavated at further distances from the initial test pits if petroleum hydrocarbon contamination was observed in any of the initial test pit locations. Figure 1 shows the supplemental test pit locations. A total of 11 test pits were excavated as part of the supplemental investigation. Representatives from the United States Environmental Protection Agency (EPA) were present at the Site during field activities and observed conditions present in each of the areas.

The test pits were excavated to depths ranging between 9.5 to 16.5 feet below ground surface (bgs). Test pits were logged by an engineer and soil was field screened (i.e., visual observation, organic vapor, and odor) for the presence of contamination. Test pit logs are included as Appendix A. The composition and stratigraphy of soil present in the test pits is documented on the test pit logs. The test pits excavated at each location were backfilled with the material excavated from the location after logging of the test pit and soil sampling were completed.

3.1.1. Summary of Field Observations

The stratigraphy observed in test pits excavated in the TP-06 and GA-3 area (i.e., TP-09 through TP-13) included the following:

- Brown, angular gravel with fine sand, cobbles, and boulders from the surface to between approximately 7 and 8 feet bgs. This material is fill and contained large boulders that were several feet square.
- Dark brown to black, wood (i.e., bark, sticks, wood fibers, etc.) and organics with sand, gravel and cobbles, from approximately 7 to 8 feet to approximately 13 to 17 feet bgs in test pits TP-10 through TP-13. This material is fill and could be former log yard debris.
- Gray, rounded sand with gravel, cobbles, and boulders below approximately 8 feet bgs in test pit TP-09. This material appears to be native soil.
- Gray, rounded gravel with sand, cobbles, and boulders below approximately 13 to 17 feet bgs in test pits TP-10 through TP-13. This material appears to be native soil.

The stratigraphy observed in test pits excavated in the TP-03 area (i.e., TP-14 through TP-19) included the following:

- Brown, angular and/or rounded gravel with sand, silt, cobbles, and boulders with random debris from the surface to between approximately 7 and 12 feet bgs. This material is fill and contained large boulders in places.
- Gray to black, rounded gravel with sand, cobbles, and boulders below approximately 7 to 12 feet bgs. This material appears to be native soil.

Additionally, at multiple locations, debris including wood, concrete, metal, pipe, and glass bottles was observed in the soil.

Petroleum hydrocarbon contamination was not observed in test pits TP-09 through TP-13 that were excavated to further characterize petroleum hydrocarbon contamination previously observed at locations TP-06 and GA-3 and therefore, no additional test pits were excavated in this area. Petroleum hydrocarbon contamination was not observed in test pits TP-16 and TP-17 but was observed in test pits TP-14 and TP-15 that were excavated to further characterize petroleum hydrocarbon contamination previously observed at locations TP-03. Additional test pits were excavated (i.e., TP-18 and TP-19) to further delineate the extent of contamination in the area surrounding supplemental test pit locations TP-14 and TP-15.

Details concerning the extent of contamination are further described in Section 4.0

3.1.2. Summary of Sample Collection and Analysis

Soil samples were collected from the test pits in accordance with the SSSP and QAPP prepared for the supplemental investigation (GeoEngineers, 2011a and 2011b). Samples were placed in clean laboratory-supplied containers, labeled, and placed on ice. Five samples and a sample duplicate were initially identified for chemical analysis based on field screening and the objectives of the supplemental investigation. The six samples that were initially identified for analysis were collected at the groundwater table where the petroleum hydrocarbon contamination was observed

during previous investigations and where there is the greatest potential to encounter petroleum hydrocarbon contamination at the Site.

Prior to final selection of samples for analysis, the recommendations for samples to be analyzed were sent to EPA in an email dated September 26, 2011 (GeoEngineers, 2011). EPA provided concurrence for the samples to be analyzed in an email dated September 27, 2011 (EPA, 2011).

The samples were submitted for the following analyses in accordance with the SSSP and QAPP for the supplemental investigation (GeoEngineers, 2011a and 2011b):

- Diesel- and oil-range petroleum hydrocarbons;
- Volatile organic compounds (VOCs);
- Semi-volatile organic compounds (SVOCs);
- Polychlorinated biphenyls (PCBs); and
- Target Analyte List (TAL) metals.

The samples were shipped to Analytical Resources, Inc. in Tukwila, Washington for analysis. The laboratory report presenting the chemical analytical results is provided in Appendix B.

3.2. Depth-to-Groundwater and Evaluation of the Presence of Petroleum Hydrocarbon Contamination on Groundwater

Depth-to-groundwater measurements and evaluation of the presence of petroleum hydrocarbon product on groundwater in existing wells and other monitoring locations was performed on September 19 and 22, 2011 to further characterize the extent of petroleum hydrocarbons on groundwater at the Site.

Information concerning previously installed monitoring wells, peizometers, as well as other monitoring locations presented in previous investigations and the EE/CA reports was used to identify the potential locations for depth-to-groundwater measurements and evaluation of the presence of petroleum hydrocarbon contamination on groundwater at the Site. Thirty five wells, piezometers, and other potential monitoring locations were found including the former domestic water supply well.

Depth-to-groundwater measurements and presence of petroleum hydrocarbon contamination and product were performed using an oil/water interface probe. Measurements with the oil/water interface probe were attempted at all of the identified, accessible locations. The oil/water interface probe was slowly lowered into each monitoring location until either product or water was detected or the bottom of the monitoring location was reached at locations where groundwater was not present. The depth-to-product, groundwater, or the bottom of the monitoring location was recorded relative to the north side of the top of the well casing or pipe present at each location. The oil/water interface probe was decontaminated between monitoring locations. Additionally, disposable bailers were used in many wells to further evaluate the presence of petroleum hydrocarbon contamination.

The wells, piezometers, and other monitoring locations where depth-to-groundwater measurements and presence of petroleum hydrocarbon contamination was evaluated are shown on Figure 1. The depths recorded at each location and observations of groundwater were recorded on field forms.

3.3. Decommissioning of a Former Domestic Water Supply Well

The domestic water supply well DW-1, was decommissioned by H20 Well Services on September 19 and 21, 2011. On September 19, 2011, H20 Well Services removed a pump, cable, and remnant supply piping from the well. On September 21, 2011, H20 Well Services used a drill rig to perforate the steel well casing and fill the well casing with bentonite grout. Well decommissioning records are included as Appendix C.

An evaluation of the presence of petroleum hydrocarbon contamination, as described above, was performed at DW-1. Petroleum hydrocarbon contamination was not observed to be present on groundwater at DW-1 as described in Section 5.0.

4.0 RESULTS OF TEST PIT EXCAVATIONS AND DELINEATION OF PETROLEUM HYDROCARBON-CONTAMINATED SOIL

As stated above, five test pits were excavated in and around previous investigation locations TP-06 and GA-3 and six test pits were completed around previous investigation location TP-03 to support evaluation of remedial actions on the western portion of the Site. Soil samples were collected from test pits in each area and analyzed for diesel- and oil-range petroleum hydrocarbons, VOCs, SVOCs, PCBs, and metals. The results for the chemical analyses performed on the soil samples are presented in Tables 1 through 5. The chemical analytical results are compared to the screening levels presented in the EE/CA report prepared for EPA (E&E, 2010). The screening levels presented in the EPA EE/CA are the Idaho Risk Evaluation Manual, Initial Default Target Levels (IDEQ, 2004). Additionally, background concentrations were used to screen the results of metals analyses if a detected metal concentration was greater than the risk-based screening level. The background metals concentrations that were used were also identified in the EPA EE/CA report (E&E, 2010).

The following sections present the results of visual observations, field screening, and analysis of soil samples collected from each area.

4.1. Summary of Results for TP-06/GA-3 Area

Test pits TP-09 through TP-13 (Figure 1) were excavated as part of the supplemental investigation to further evaluate the presence of petroleum hydrocarbon contamination in and around the former investigation locations TP-06 and GA-3. Observations during previous investigations identified the following at these locations:

- The test pit log for TP-06 identified “oily product globules” in sand and gravel present at the groundwater surface at a depth of 17 feet bgs.
- The boring log for GA-3 identified sheen in sand and gravel present at the groundwater surface at a depth of 17 feet bgs.

4.1.1. Field Observations and Identification of Samples for Analysis

During the supplemental investigation, no petroleum product or oil was observed in any of the test pits excavated in this area. No iridescent (i.e., shiny, multicolored) sheen was observed on soil or during soil sheen testing at test pits TP-09 through TP-13. A slight sheen in the form of a dull, non-iridescent (i.e., not shiny, not multicolored) organic film that was present in ribbons and/or blocky shapes was observed in several locations in soil sheen testing performed on material present at the groundwater surface. The observed sheen was organic in nature (i.e., not characteristic of petroleum hydrocarbon contamination) as it fractured when it was disturbed. The slight sheen that was observed was likely the result of the degradation of wood present in the soil or possibly, extremely weathered, degraded petroleum.

Test pit TP-11 was excavated near the previous location of TP-06. As stated above, no oil was observed in the test pits in this area including TP-11 and therefore, the observations from the supplemental investigation did not confirm the previous observations in test pit TP-06. Therefore, if there was "oily product globules" observed during the previous investigation at TP-06, it was limited and not indicative of a significant source. Based on visual observations and field screening in all five supplemental test pits, the presence of product constituting a hot spot requiring excavation was not observed in this area. General concurrence with the observations made during excavation of test pits in the TP-06 and GA-3 area was provided by the EPA representative that was present during field activities.

Based on the observations of soil in the test pits excavated in this area, the sample from TP-11 collected from the saturated soil horizon, at the groundwater surface, and at the depth of 18 to 19 feet bgs (i.e., TP-11-18-19) was selected for analysis. As stated above, EPA concurred with the selection of the sample from TP-11 for analysis (EPA, 2011). A field duplicate sample (i.e., TP-11-18-19-2) was also analyzed from TP-11. The results for the samples collected from TP-11 corroborate the visual observations and indicate that a source of petroleum product to groundwater is not present in this area.

4.1.2. Analytical Results for Soil Samples

Diesel- and oil-range petroleum hydrocarbons were detected in the samples collected from test pit TP-11 (Table 1). However, the detected concentrations were relatively low. The diesel-range petroleum hydrocarbon concentrations were 64 and 49 mg/kg and the oil-range petroleum hydrocarbon concentrations were 160 and 100 mg/kg.

Relatively few VOCs and SVOCs were detected in the samples collected from TP-11 (Tables 2 and 3). The detected concentrations of all VOCs and SVOCs were less than the EE/CA screening levels (E&E, 2010).

Multiple metals were detected in the samples collected from TP-11 (Table 4). The detected concentrations for metals were less than the EE/CA screening levels except for the detected concentrations of arsenic and mercury. However, the concentrations for arsenic and mercury were less than the background concentrations presented in the EE/CA (E&E 2010). The risk-based screening levels for multiple metals including arsenic and mercury are commonly less than background concentrations and it is general practice to use background concentrations as the screening level.

The PCB aroclors 1254 and 1260 were detected in the samples collected from test pit TP-11 (Table 5). The detected PCB concentrations were an order of magnitude below the EE/CA screening levels.

4.1.3. Summary of Results for TP-06/GA-3 Area

Petroleum product was not observed in soil in any of the test pits excavated in the TP-06/GA-3 area. A slight sheen (i.e., dull, non-iridescent, organic film) was observed in several locations in soil sheen testing performed on material present at the groundwater surface including at TP-11. The petroleum hydrocarbon concentrations detected in samples collected from TP-11 were low and do not indicate the presence of a source of petroleum hydrocarbon product to groundwater at the Site. Additionally, the detected concentrations of VOCs, SVOCs, metals, and PCBs are less than the risk-based screening levels or background concentrations identified in the EE/CA (E&E, 2010). Therefore, the results of the supplemental investigation in the area of previous investigation locations TP-06 and GA-3, identify that no remedial excavation is warranted in this area.

4.2. Results for TP-03 Area

Test pit TP-14 through TP-19 (Figure 1) were excavated as part of the supplemental investigation to further evaluate the presence of petroleum hydrocarbon contamination around the former investigation location TP-03. Observations during previous investigations identified the following at this location:

- The test pit log for TP-03 identified "oil-like staining" in gravel and sand at the groundwater surface at a depth of 13.5 feet bgs.

4.2.1. Field Observations and Identification of Samples for Analysis

During the supplemental investigation, petroleum hydrocarbon contamination was observed in TP-14 that consisted of a black, viscous petroleum product that was present at the groundwater surface at a depth of approximately 9 to 10 feet bgs. The product present at 9 to 10 feet bgs coated the sand and gravel soil. Less viscous, lighter-end petroleum product was observed at a depth below the more viscous petroleum product. The petroleum product present in TP-14 emitted a petroleum-like odor and heavy, iridescent sheen when sheen testing was performed on the soil.

A petroleum-like odor was detected and an iridescent sheen was observed in TP-15 at a depth of 9 feet bgs at the depth of groundwater. The product observed in TP-15 was a less viscous, lighter-end petroleum product. The less viscous product observed in TP-15 also produced a moderate, iridescent sheen when sheen testing was performed on the soil.

Test pits TP-16 through TP-19 were excavated at locations around previous investigation location TP-03 as well as supplemental investigation locations TP-14, and TP-15. Petroleum product was not observed in test pits TP-16 through TP-19. No iridescent (i.e., shiny, multicolored) sheen was observed on soil or during soil sheen testing at these locations. A slight sheen in the form of a dull, non-iridescent (i.e., not shiny, not multicolored) organic film (i.e., not characteristic of petroleum hydrocarbon contamination) that was present in ribbons and/or blocky shapes was observed in two locations (i.e., TP-16 and TP-17) in soil sheen testing performed on material present from 11 to 12 feet bgs. The sheen that was observed in the soil may have been the result of extremely weathered, degraded petroleum.

Based on observations of soil of the test pits in this area, the following samples were submitted for analysis:

- TP-15 – sample collected from the saturated zone at 9 to 10 feet bgs (i.e., TP-15-9-10)
- TP-17 – sample collected from the saturated zone at 12 to 13 feet bgs (i.e., TP-17-12-13)
- TP-18 – sample collected from the saturated zone at 8 to 9 feet bgs (i.e., TP-18-8-9)
- TP-19 – sample collected from the saturated zone at 10 to 11 feet bgs (i.e., TP-19-10-11)

The sample collected from TP-15 was analyzed to provide additional information concerning chemical concentrations in soil when a petroleum odor and iridescent sheen is present in the soil. The samples from TP-17, TP-18, and TP-19 were analyzed to provide additional information for soil in the saturated zone in contact with groundwater that are at locations around the perimeter of the area of product observed in test pit TP-14 and TP-15 to provide data to bound the area of observed product. As stated above, EPA concurred with the selection of the samples to be analyzed from the TP-03 area (EPA, 2011).

4.2.2. Analytical Results for Soil Samples

Diesel-range petroleum hydrocarbons were detected in the sample collected from test pit TP-15 at a concentration of 820 mg/kg (Table 1). The detection of diesel, a lighter-end petroleum product, is consistent with observations during excavation of test pit TP-15. Petroleum hydrocarbons were not detected in the samples collected from test pits TP-17 and TP-19. Diesel- and oil-range petroleum hydrocarbons were detected in the samples collected from test pit TP-18 at 8.5 and 25 mg/kg, respectively. The detected concentrations were near the detection limit.

One VOC and two SVOCs were detected in all four samples collected from the TP-03 area including TP-15 (Tables 2 and 3). The concentrations of the detected VOC and SVOCs were less than the EE/CA screening levels (E&E, 2010).

Multiple metals were detected in the samples collected from the TP-03 area (Table 4). The detected concentrations of metals were less than the EE/CA screening levels except for the detected concentrations of arsenic and manganese. However, the concentrations of theses metals were less than the background concentrations presented in the EE/CA (E&E, 2010). The risk-based screening levels for multiple metals are commonly less than background concentrations and it is general practice to use background concentrations as the screening level.

PCBs were not detected in soil samples collected from test pits TP-17, TP-18, and TP-19 (Table 5). The PCB aroclor 1260 was detected in the sample collected from test pit TP-15 at a concentration an order of magnitude below the EE/CA screening levels.

4.2.3. Summary of Results for TP-03 Area

In summary, petroleum product was observed in soil present at the depth of groundwater in test pits TP-14 and TP-15. Petroleum hydrocarbon contamination was not observed in test pits TP-16 through TP-19 that were excavated at locations around previous investigation location TP-03 as well as supplemental investigation locations TP-14 and TP-15. The detected concentrations of VOCs, SVOCs, metals, and PCBs are less than the risk-based screening levels or background

concentrations identified in the EE/CA (E&E, 2010). Based on the results of the supplemental test pit excavations and soil sampling and analysis, the petroleum hydrocarbon contamination previously observed at TP-03 and observed in supplemental test pit locations TP-14 and TP-15 is bounded by supplemental test pits TP-16 through TP-19.

5.0 RESULTS FROM THE EVALUATION OF THE PRESENCE OF PETROLEUM HYDROCARBON CONTAMINATION ON GROUNDWATER

As stated above, depth-to-groundwater measurements and evaluation of the presence of petroleum hydrocarbon contamination on groundwater was performed at all identified, accessible locations wells and other monitoring locations present at the Site. The results from monitoring performed at each location are summarized in Table 6. Figure 1 also identifies the location where petroleum was observed.

Measurable petroleum hydrocarbon contamination was identified at two locations. Measurable petroleum hydrocarbon contamination was detected with the oil/water interface probe in EMW-06 at approximately 0.01 foot thick. Measurable petroleum hydrocarbon contamination was also detected at monitoring well MW-11. A viscous, black petroleum product was initially detected with the oil/water interface probe. However, the interface probe was fouled by the product so a depth-to-groundwater measurement could not be made with the probe. Therefore, a PVC pipe was used to probe the product in MW-11. Approximately 2.5 feet of product was identified to be present at monitoring well MW-11.

Petroleum hydrocarbon contamination was visually observed on/in water bailed from four additional monitoring locations (i.e., in addition to EMW-06 and MW-11) including 1010, 1031, EMW-04, and EW-5. The petroleum hydrocarbon contamination that was observed consisted of either sheen, separated globules of petroleum, or smeared product on the outside of the disposable bailer. Faint petroleum odors were also detected in groundwater in monitoring locations 1012 and EMW-05 and in soil coating the tip of the oil/water interface probe in 1024 where groundwater was not present.

No measurable groundwater was present in monitoring locations 1007, 1015, 1023, 1024, 1030 or the “Piezometer” during the supplemental investigation.

The observations of the presence of petroleum hydrocarbon contamination during the supplemental investigation performed in 2011 were generally similar to observations made in September 2009 as part of the EE/CA prepared for Potlatch (Golder, 2010). It should be noted that a disposable bailer was used to withdraw groundwater in many wells during the supplemental investigation performed in 2011, but not in 2009, to further evaluate the presence of petroleum hydrocarbon contamination on groundwater. The following is a summary of the comparison of the petroleum hydrocarbon observations in September 2009 and September 2011:

- Product was observed in MW-11 in 2009 (approximately 2.5 feet thick) and 2011 (not measured);
- A measurable layer of product was present in EMW-06 in 2009 (0.24 feet thick) and 2011 (0.01 feet thick) but the thickness was less in 2011;

- A measurable layer of product was present in GA-1 in 2009 (0.01 feet thick) but not present in 2011;
- Indications of the presence of petroleum hydrocarbon contamination (i.e., presence of oil, globules, etc.) were observed in EMW-04 and 1010 in 2009 and 2011);
- A sheen was observed in EW-4 in 2009 but not in 2011;
- A sheen was not observed in 1031 and EW-5 in 2009 but was observed in 1031 and EW-5 in 2011.

6.0 REFERENCES

GeoEngineers, 2011a. Site Specific Sampling Plan, Avery Landing Site, Avery, Idaho for Potlatch Forest Holdings, Inc., August 30, 2011.

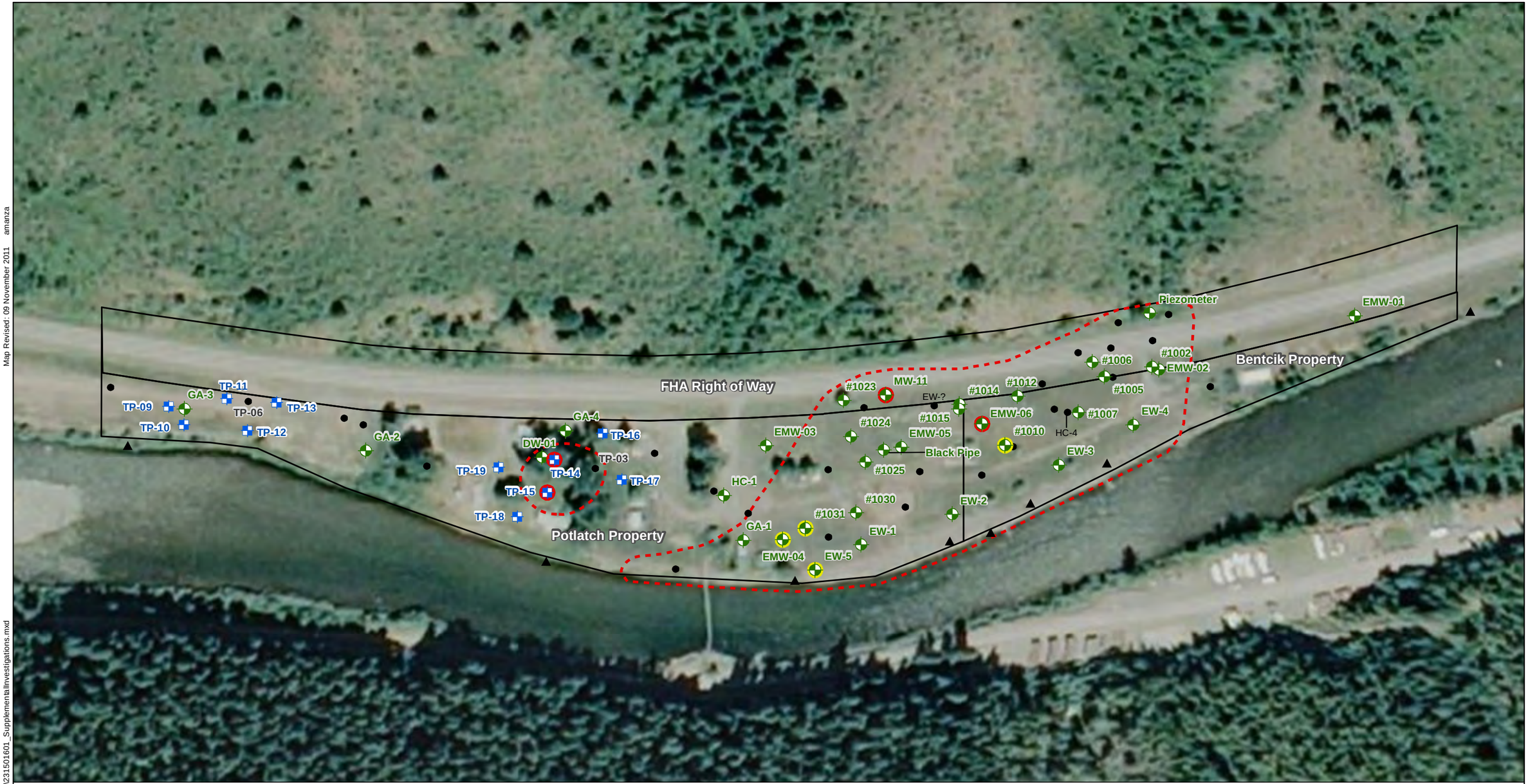
GeoEngineers, 2011b. Quality Assurance Project Plan, Avery Landing Site, Avery, Idaho for Potlatch Forest Holdings, Inc., August 30, 2011.

Golder and Associates, 2010. Engineering Evaluation/Cost Analysis, Avery Landing Site, Avery, Idaho for Potlatch land and Lumber, LLC. October 15, 2010

Ecology & Environment, 2010. Draft Final Engineering Evaluation/Cost Analysis, Avery Landing Site, Avery, Idaho for U.S. EPA. December 2010.

IDEQ, 2004. Idaho Department of Environmental Quality. Risk Evaluation Manual. July 2004.

URS Greiner, Inc. Final Technical Memorandum (Rev. 3): Estimation of Background Concentrations in Soil, Sediment and Surface Water in the Cour d'Alene and Spokane River Basins prepared for U.S. EPA, Contract No. 68-W-98-228, Work Assignment No. 027-RI-CO-102Q, Seattle, Washington. October 5, 2001.



Map Revised: 09 November 2011 amanza

Path: \\sea\Projects\23231501\GIS\23151601_SupplementalInvestigations.mxd

Office: TAC

Data Source: ESRI World Imagery, NAIP 2009.
Sample Points and Boundaries digitized from:
Golder Associates (October 15, 2010) and
Ecology and Environment Inc. (December, 2010).

Projection: NAD 1983 StatePlane Idaho West FIPS 1103 Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Legend

- Property Boundary
- Estimated Area of Product in Soil
- Previous Soil/Groundwater Investigation Location
- Previous Sediment Investigation Location
- Supplemental Test Pit Location
- Groundwater Level/Product Presence Monitoring Location
- Measurable Petroleum Hydrocarbon Contamination at Location
- Petroleum Hydrocarbons Observed at Location (i.e., sheen or globules)

N W E S

150 0 150
Feet

Supplemental Investigation Locations and Results

Avery Landing Site
Avery, Idaho

GeoEngineers

Figure 1

APPENDIX A
Test Pit Logs

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% RETAINED ON NO. 200 SIEVE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	CC	Cement Concrete
	AC	Asphalt Concrete
	CR	Crushed Rock/ Quarry Spalls
	TS	Topsoil/ Forest Duff/Sod

Measured groundwater level in exploration, well, or piezometer

Groundwater observed at time of exploration

Perched water observed at time of exploration

Measured free product in well or piezometer

Graphic Log Contact

Distinct contact between soil strata or geologic units

Approximate location of soil strata change within a geologic soil unit

Material Description Contact

Distinct contact between soil strata or geologic units

Approximate location of soil strata change within a geologic soil unit

Sampler Symbol Descriptions

2.4-inch I.D. split barrel

Standard Penetration Test (SPT)

Shelby tube

Piston

Sonic Core

Bulk or grab

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

A "P" indicates sampler pushed using the weight of the drill rig.

Laboratory / Field Tests

%F	Percent fines
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
OC	Organic content
PM	Permeability or hydraulic conductivity
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen
NT	Not Tested

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

KEY TO EXPLORATION LOGS

GeoEngineers

FIGURE A-1

Date Excavated: 9/20/2011 Logged By: JRH

Equipment: Case CX 210B Total Depth (ft) 17.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID	Notes
0			ML		Brown silt with fine to coarse sand and angular gravel, roots (loose, moist)			
1			GW-GM		Light brown gravel with fine to coarse sandy silt angular cobbles and boulders (loose, moist)			
4					Large boulders			
5					Extremely hard digging, layer of large angular boulders			
7					Metal debris			
8			SW-SM		Dark gray silty sand with subangular to rounded gravel, cobbles and boulders (loose, moist)			
10						NS	0.0	
13					Large boulder			
14					Metal debris			
15					Wood debris			
16				▽		SS	0.0	blocky sheen
17					Grades to wet			

Test pit completed at 17 feet
Groundwater seepage observed at 16.5 feet
Moderate caving from 0 to 8 feet; severe caving from 8 feet to depth observed

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

Log of Test Pit TP-09

GeoEngineers

Project: Avery Landing
Project Location: Avery, Idaho
Project Number: 2315-016-01

Figure A-2
Sheet 1 of 1

Date Excavated: 9/20/2011 Logged By: JRH

Equipment: Case CX 210B Total Depth (ft) 19.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID	Notes
0			ML		Brown silt with fine to coarse sand, angular gravel and cobbles (loose, moist)			
1			GW-GM		Light brown gravel with silt, fine to coarse sand and angular cobbles and boulders (south side may be armoring of St. Joe River bank; smaller particle sizes on north sidewall but similar material) (loose, moist)			
2								
3								
4								
5								
6								
7								
8			SW-SM		Dark brown to black fine to coarse sand with silt, angular gravel and cobbles, wood debris (loose, moist)			
9								
10								
11								
12						NS	0.0	
13			GW		Gray fine to coarse rounded gravel with silt and fine to coarse sand, trace clay, cobbles (loose, moist)			
14								
15								
15						SS	3.6	Blocky-organic sheen
16				▽				
17					Grades with rounded boulders (wet)	SS	0.0	Blocky sheen
18								
19					Test pit completed at 19 feet Groundwater seepage observed at 16.5 feet Moderate caving observed			

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

Log of Test Pit TP-10

GeoEngineers

Project: Avery Landing
Project Location: Avery, Idaho
Project Number: 2315-016-01

Figure A-3
Sheet 1 of 1

Date Excavated: 9/20/2011 Logged By: JRH

Equipment: Case CX 210B Total Depth (ft) 19.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID	Notes
0			GW-GM		Brown angular fine to coarse gravel with silt and fine sand, angular cobbles, boulders and roots (loose, moist)			
1								
2					Grades with decreasing cobbles/boulders			
3								
4								
5					Approximate 4-foot long x 2 foot x 2 foot angular boulder			
6								
7								
8			SW-SM		Black fine to coarse sand with silt, angular gravel and wood debris (loose, moist)	0.0	NS	
9								
10								
11								
12								
13			ML		Dark brown silt with fine sand and rounded gravel, wood debris and some cobbles (loose, moist)			
14								
15			SP-SM		Gray fine sand with rounded gravel and wood debris, trace silt (loose, moist)	0.0	NS	
16								
17			SW		Gray fine to coarse sand with fine to coarse rounded gravel and cobbles (loose, wet)			
18	TP-11-18-19/ TP-11-18-19-2 CA			▽		0.0	NS	Slight sheen in excavator bucket (ribbons)
19					Test pit completed at 19 feet Slow groundwater seepage observed at 18 feet Severe caving observed			

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

Log of Test Pit TP-11

GeoEngineers

Project: Avery Landing
Project Location: Avery, Idaho
Project Number: 2315-016-01

Figure A-4
Sheet 1 of 1

Date Excavated: 9/20/2011 Logged By: JRH

Equipment: Case CX 210B Total Depth (ft) 17.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID	Notes
0			GW-GM		Brown fine to coarse angular gravel with silt, fine sand, angular cobbles, angular boulders and roots (loose, moist)			
1								
2					Fiberglass debris, concrete slab debris (approximately 4 feet long x 4 feet wide x 4 inches thick), pipe, metal and wood debris			
3								
4								
5								
6								
7			SW-SM		Dark brown-black fine to coarse sand with silt and angular to rounded gravel, wood debris (loose, moist)	NS	0.0	
8								
9								
10								
11					Engine, car door, car parts, transmission, front suspension			
12								
13								
14								
15			GW-GM		Dark brown-black fine to coarse rounded gravel with fine to coarse sand, silt, trace clay and wood debris (loose, moist)	SS	0.0	Blocky sheen
16				▽	Grades to gray (loose, wet) slight petroleum odor	SS	0.0	Blocky sheen
17					Test pit completed at 17 feet Slow groundwater seepage observed at 16 feet Minor caving observed at 0 to 8 feet			

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

Log of Test Pit TP-12

GeoEngineers

Project: Avery Landing
Project Location: Avery, Idaho
Project Number: 2315-016-01

Figure A-5
Sheet 1 of 1

Date Excavated: 9/20/2011 Logged By: JRH

Equipment: Case CX 210B Total Depth (ft) 16.5

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID	Notes
0			GW-GM		Tan fine to coarse angular gravel with sand, cobbles and some boulders (loose, moist) roots			
1								
2								
3					Grades with fewer cobbles			
4								
5								
6								
7			SW-SM		Dark brown-black fine to coarse sand with silt and angular to sub-rounded gravel, wood debris and cobbles (loose, moist)			
8								
9								
10								
11								
12								
13						NS	0.0	
14								
15				▽		NS	0.0	
16					Grades to wet			

Test pit completed at 16.5 feet
Groundwater seepage observed at 15.5 feet
Severe caving observed at 3 to 15 feet

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

Log of Test Pit TP-13

GeoEngineers

Project: Avery Landing
Project Location: Avery, Idaho
Project Number: 2315-016-01

Figure A-6
Sheet 1 of 1

Date Excavated: 9/21/2011 Logged By: JRH

Equipment: Case CX 210B Total Depth (ft) 12.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID	Notes
0			ML		Brown fine to coarse sandy silt with fine gravel, trace clay and root tendrils (loose, moist)			
1			GW-GM		Gray fine to coarse gravel with silt, sand, angular cobbles and decreasing roots (loose, dry)			
2			SW-SM		Gray-brown fine to coarse sand with silt and roots (0.5 to 2 inches diameter) rounded and angular cobbles, trace clay (loose, moist)			
3					Metal debris			
4					Grades with increasing angular cobbles			
5								
6								
7								
8								
9			GW	▽	Black fine to coarse rounded gravel with sand, petroleum odor (heavy end), black viscous petroleum throughout pore space (loose, wet)	HS	18.6	Blocky sheen
10								
11								
12					Grades to gray, petroleum odor (lighter end), product not as viscous			

Test pit completed at 12 feet
Slow groundwater seepage observed at 9 feet
Moderate caving observed at 4 feet

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

Log of Test Pit TP-14

GeoEngineers

Project: Avery Landing
Project Location: Avery, Idaho
Project Number: 2315-016-01

Figure A-7
Sheet 1 of 1

Date Excavated: 9/21/2011 Logged By: JRH

Equipment: Case CX 210B Total Depth (ft) 11.0

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID	Notes
	0				ML		Brown fine to coarse sandy silt with fine to coarse angular gravel and root tendrils (loose, moist)			
	1				GW-GM		Light fine to coarse gray rounded gravel with sand, silt, rounded and angular cobbles and angular boulders, 4-inch iron pipe in southeast sidewall (loose, moist)			
	2									
	3									
	4						2-inch PVC pipe running northeast to southwest			
	5									
	6						Wood debris (three tree trunks laid on top of each other running parallel to test pit)			
	7									
	8									
	9	X	TP-15-9-10 CA		GW	▽	Gray fine to coarse rounded gravel with fine to coarse sand, petroleum odor (light end) (loose, wet)	MS	34.0	
	10									
	11						Test pit completed at 11 feet Groundwater seepage observed at 9 feet Severe caving observed 0 to 11 feet			

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

Log of Test Pit TP-15

GeoEngineers

Project: Avery Landing
Project Location: Avery, Idaho
Project Number: 2315-016-01

Figure A-8
Sheet 1 of 1

Date Excavated: 9/21/2011 Logged By: JRH

Equipment: Case CX 210B Total Depth (ft) 12.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID	Notes
0			ML		Dark brown fine to coarse sandy silt with fine to coarse rounded and angular gravel, root tendrils (loose, moist)			
1			GW-GM		Brown fine to coarse angular gravel with silt, sand, angular cobbles and metal debris (wire rope) (loose, moist)			
2								
3					Galvanized 1-inch water pipe (disconnected), brick			
4					Roots (approximately 1/2-inch diameter)			
5								
6								
7								
8					Grades with increasing rounded gravel and larger angular cobbles			
9								
10						NS	0.0	
11			GW	▽	Gray-brown fine to coarse rounded gravel with fine to coarse sand and rounded cobbles (loose, wet)	SS	0.0	Very light ribbons to blocky sheen
12					Test pit completed at 12 feet Slow groundwater seepage observed at 11 feet Minor caving observed 0 to 12 feet			

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

Log of Test Pit TP-16

GeoEngineers

Project: Avery Landing
Project Location: Avery, Idaho
Project Number: 2315-016-01

Figure A-9
Sheet 1 of 1

Date Excavated: 9/21/2011 Logged By: JRH

Equipment: Case CX 210B Total Depth (ft) 13.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID	Notes
0			GW-GM		Brown fine to coarse angular gravel with silt, fine to coarse sand and root tendrils (1/4-inch diameter) (loose, moist)			
1					Grades to gray-brown with angular cobbles			
2			ML		Dark gray silt with sand, angular gravel and cobbles, wood and roots (loose, moist)			
3								
4			SW-SM		Light brown fine to coarse sand with silt and fine to coarse angular gravel (loose, moist)			
5					Grades with cobbles			
6								
7								
8								
9								
10								
11						NS	0.0	
12	TP-17-12-13 CA		GW	▽	Gray-brown fine to coarse rounded gravel with sand, rounded cobbles, trace clay (loose, wet)	SS	0.0	Blocky sheen
13								

Test pit completed at 13 feet
Slow groundwater seepage observed at 12 feet
Minor caving observed

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

Log of Test Pit TP-17

GeoEngineers

Project: Avery Landing
Project Location: Avery, Idaho
Project Number: 2315-016-01

Figure A-10
Sheet 1 of 1

Date Excavated: 9/21/2011 Logged By: JRH

Equipment: Case CX 210B Total Depth (ft) 9.5

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID	Notes
0			ML		Brown fine to coarse sandy silt with fine to coarse angular gravel, root tendrils, rounded cobbles (loose, moist)			
1			GW-GM		Light brown fine to coarse angular gravel with silt, fine to coarse sand, angular cobbles, roots (3/8 inch) and metal debris (loose, moist)			
2					Grades with angular boulders, metal debris (wire cable)			
3								
4								
5								
6			MH		Glass bottles Brown silt with rounded gravel and cobbles (loose, moist)			
7			GW		Gray fine to coarse rounded gravel with sand (loose, moist)	NS	0.0	
8	TP-18-8-9 / CA			▽		NS	0.0	
9					Grades to wet			

Test pit completed at 9.5 feet
Slow groundwater seepage observed at 8.5 feet
Moderate caving observed at 0 to 9 feet

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

Log of Test Pit TP-18

GeoEngineers

Project: Avery Landing
Project Location: Avery, Idaho
Project Number: 2315-016-01

Figure A-11
Sheet 1 of 1

Date Excavated: 9/21/2011 Logged By: JRH

Equipment: Case CX 210B Total Depth (ft) 11.0

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample / Sample Name Testing	Graphic Log	Group Classification	Encountered Water	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID	Notes
0			GW-GM		Brown fine to coarse angular gravel with silt and root tendrils (loose, moist)			
1					Grades to gray-brown with rounded gravel and cobbles (loose, dry)			
2								
3								
4					4-inch PVC pipe (empty) running approximately northeast to southwest			
5								
6					1-1/2-inch PVC pipe running approximately northeast to southwest			
7								
8								
9			SP		Rust brown fine sand with fine tno coarse rounded gravel and trace clay (loose, moist)	NS	0.0	
10	TP-19-10-11 CA		GW	▽	Brown fine to coarse rounded gravel with fine to coarse sand, rounded cobbles (loose, wet)	NS	0.0	
11					Test pit completed at 11 feet Slow groundwater seepage observed at 10 feet Severe caving observed			

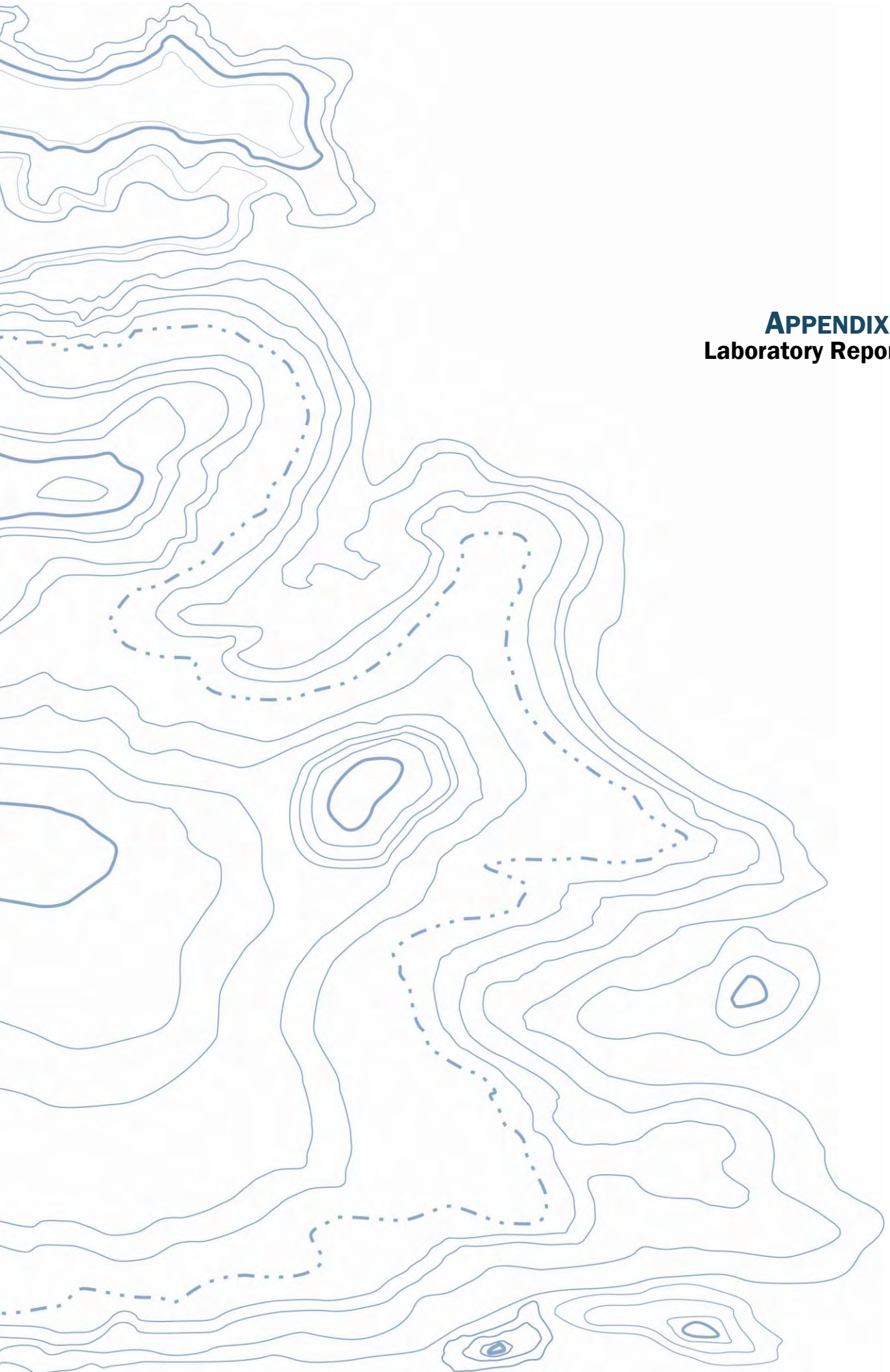
Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

Log of Test Pit TP-19

GeoEngineers

Project: Avery Landing
Project Location: Avery, Idaho
Project Number: 2315-016-01

Figure A-12
Sheet 1 of 1



APPENDIX B
Laboratory Reports

DATA QUALITY ASSESSMENT SUMMARY

LABORATORY SAMPLE DELIVERY GROUP (SDG): T055

This report presents the results of a United States Environmental Protection Agency (USEPA) defined Stage 2B validation (USEPA Document 540-R-08-005) of analytical data resulting from the analyses of soil samples obtained during supplemental investigation at the Avery Landing Site. The data validation included verification and validation checks of the following quality control (QC) elements:

- Chain of Custody
- Holding Times
- Surrogates
- Method and Trip Blanks
- Laboratory Control Samples
- Matrix Spikes/Matrix Spike Duplicates
- Laboratory and Field Duplicates
- Internal Standards
- Dual column confirmations (PCBs only)
- Instrument Initial Calibrations (ICALs)
- Instrument Continuing Calibrations (CCALs)
- Instrument Tunes

Data Package Completeness

Analytical Resources, Incorporated (ARI), located in Tukwila, Washington, analyzed the soil samples evaluated as part of the data validation review. The laboratory provided Forms I, II and III for the Stage 2B validation. The laboratory followed adequate corrective action processes and all identified anomalies were discussed in the case narrative.

The following sections present the results of the data validation review.

Objective

The objective of the data quality assessment was to review laboratory analytical procedures and quality control (QC) results to evaluate whether:

- The samples were analyzed using well-defined and acceptable methods that provide detection limits below applicable regulatory criteria;
- The precision and accuracy of the data are well defined and sufficient to provide defensible data; and

- The quality assurance/quality control (QA/QC) procedures utilized by the laboratory meet acceptable industry practices and standards.

Five (5) soil samples, one field duplicate, and two trip blanks were analyzed by one or more of the following analytical methods:

- Volatile Organic Compounds by SW8260C analysis;
- Semivolatile Organic Compounds by SW8270D analysis;
- PCB Aroclors by SW8082 analysis;
- Total Metals and Mercury by 6010B/200.2 and 7471A analysis; and
- Total Petroleum Hydrocarbons by NWTPH-Dx analysis.

Data Quality Assessment Summary

The results for each of the QC elements are summarized below. The data assessment was performed using guidance in the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA 2002) and *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA 1999).

Chain-of-Custody Documentation

Chain-of-custody (COC) forms were provided with the laboratory analytical reports. There were no anomalies noted on the COC forms; proper COC protocols appear to have been followed during the September 2011 supplemental investigation.

Holding Times

The holding time is defined as the time that elapses between sample collection and sample analysis. Maximum holding time criteria exist for each analysis to help ensure that the analyte concentrations found at the time of analysis reflect the concentration present at the time of sample collection. Established holding times were met for all analyses.

Surrogate Recoveries

A surrogate compound is a compound that is chemically similar to the analytes of interest, but unlikely to be found in any environmental sample. Surrogates are used for organic analyses and are added to all samples, standards, and blanks to serve as an accuracy and specificity check of each analysis. The surrogates are added at a known concentration and percent recoveries are calculated following analysis. All surrogate recoveries for field samples were within the laboratory control limits.

Internal Standards (Applies to VOCs, SVOCs, and PCBs)

Like the surrogate, an internal standard is a compound that is chemically similar to the analytes of interest, but unlikely to be found in any environmental sample. Internal standards are used only for the mass spectrometry (MS) instrumentation and are usually added to the sample aliquot after extraction has taken place. The internal standard should be analyzed at the beginning of a 12 hour sample run and the control limits for internal standard recoveries are -50% to +100% of the calibration standard. All internal standard recoveries were within the control limits.

Method Blanks

Method blanks are analyzed to ensure that laboratory procedures and reagents do not introduce measurable concentrations of the analytes of interest. Method blanks were analyzed with each batch of samples, at a frequency of one per twenty samples. For all sample batches, method blanks for all applicable methods were analyzed at the required frequency. None of the analytes of interest were detected above the reporting limits in the method blanks, with the exception below:

SDG T055 (Semi-Volatiles). The method blank analyzed on 9/30/11 reported a positive detection for bis(2-ethylhexyl)phthalate at less than five times the reporting limit. This compound was also reported in all of the associated field samples at levels below five times their respective reporting limits. For this reason, the positive results for this compound were qualified as not detected (U) in all samples in this sample delivery group.

Trip Blanks

Trip blanks are analyzed to assess whether field sampling or sample transport processes may have introduced measurable concentrations of volatile analytes of interest into field samples. Two trip blanks, TRIP BLANK1_110920 and TRIP BLANK2_110920, were analyzed for this sampling event. The two trip blanks were representative of the transportation conditions for two different sample coolers. None of the analytes of interest were detected above the reporting limits in the trip blanks, with the exceptions below:

TRIP BLANK1_110920. In the first sample cooler, the trip blank reported a positive result for methylene chloride at less than two times the reporting limit. The associated field sample TP-11-18-19 also reported a positive detection for methylene chloride at greater than twice the reporting limit. However, the result was less than 10 times the amount present in the trip blank. Professional judgment was used in deciding to qualify the associated result as not-detected (U) due to trip blank contamination.

TRIP BLANK2_110920. In the second sample cooler, the trip blank reported a positive result for methylene chloride at less than two times the reporting limit. The associated field samples TP-17-12-13, TP-18-8-9, and TP-19-10-11 also reported a positive detection for methylene chloride at greater than twice the reporting limit in each sample. However, the results were each less than 10 times the amount present in the trip blank. Professional judgment was used in deciding to qualify the associated results as not-detected (U) due to trip blank contamination.

Matrix Spikes/Matrix Spike Duplicates (MS/MSD)

Because the actual analyte concentration in environmental samples is not known, the accuracy of a particular analysis is usually inferred by performing a matrix spike (MS) analysis. One aliquot of sample is analyzed in the normal manner, than a second aliquot of the sample is spiked with a known amount of analyte concentration and analyzed. From these analyses, a percent recovery (%R) is calculated. Matrix spike duplicates (MSD) analyses are generally performed for organic analyses as a precision check. For some organic analytical methods, such as NWTPH-Dx, or SW8260 Volatiles analysis, a laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) sample set is performed in lieu of a MS/MSD analysis.

For inorganics methods, the matrix spike (referred to as a "spiked sample") is typically followed by a post-spike sample if any element recoveries were outside the control limits in the "spike sample". In these cases, only the post spiked sample recoveries are used for assessment.

Matrix spike analyses should be performed once per analytical batch or every twenty field samples, whichever is more frequent. The recovery criteria for matrix spikes and laboratory control samples are specified in the laboratory documents as are the relative percent difference values. The frequency requirements were met for all analyses, and the %R/RPD values were within the proper control limits, with the exception below.

SDG T055 (Semi-Volatiles). A MS/MSD sample set was performed on Sample TP-17-12-13. The MS/MSD %R values for hexachlorocyclopentadiene were less than the lower control limits. This outlier was attributed to the isolated, inhomogeneous nature of the sample matrix. As there were no other target analytes that exhibited a similar bias, professional judgment was used in deciding to take no action for this outlier other than to note the discrepancy.

Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD)

A laboratory control sample is essentially a blank sample that is spiked with a known amount of analyte concentration and analyzed. It is to be treated much like a matrix spike, without the possibility for matrix interference. As there is no actual sample matrix in the analysis, the analytical expectations for accuracy and precision are usually more rigorous and qualification would apply to all samples in the batch, instead of the parent sample only.

Laboratory control sample analyses should be performed once per analytical batch or every twenty field samples, whichever is more frequent. The recovery criteria for laboratory control samples are specified in the laboratory documents as are the relative percent difference values. The frequency requirements were met for all analyses, and the %R/RPD values were within the proper control limits, with the exception below.

SDG T055 (Volatiles). The LCSD %R value for trichlorofluoromethane exceeded the upper control limit in the low level LSC/LCSD sample set extracted on 9/30/11. The corresponding LCS %R value was within the control limits and therefore, no further action was required.

Laboratory Duplicates (Applies to Metals and Petroleum Hydrocarbons)

Internal laboratory duplicate analyses are performed to monitor the precision of the analyses. Two separate aliquots of a sample are analyzed as distinct samples in the laboratory, and the RPD between the two results is calculated. Duplicate analyses should be performed once per analytical batch. If one or more of the samples used has a concentration greater than five times the reporting limit for that sample, the absolute difference is used instead of the RPD.

Laboratory duplicates were analyzed at the proper frequency and the specified acceptance criteria were met in all cases.

Field Duplicates

Field duplicate samples were collected and analyzed along with the reviewed sample batches. The duplicate samples were analyzed for the same parameters as the associated parent samples. As

mentioned above for the laboratory duplicates, the RPD is used as the criteria for assessing precision, unless one or more of the samples used has a concentration greater than five times the reporting limit for that sample, then the absolute difference is used instead of the RPD.

SDG TL17. One set of field duplicates, Samples TP-11-18-19 & TP-11-18-19-2, was submitted to the laboratory. All RPD and absolute difference values were within the control limits, with the following exceptions:

- (VOCs) The RPD/absolute difference values for 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, acetone, 4-isopropyltoluene, mp-xylene, o-xylene, were greater than the control limits of 50% and/or 2x the PQL. The positive results for these analytes were qualified as estimated (J) in both samples.
- (SVOCs) The RPD/absolute difference values for fluoranthene and pyrene were greater than the control limits of 50% and/or 2x the PQL. The positive results for these analytes were qualified as estimated (J) in both samples.

Dual Column Confirmations

The PCB Aroclor compounds are analyzed by two columns, a primary and a secondary column. The percent difference (%D) values for any positive results between the primary and secondary columns are assessed against a control limit of 40%. All positive results for Aroclors were properly confirmed by a secondary column with %D values less than 40%.

Initial Calibrations (ICALs)

All initial calibrations were conducted according to the laboratory methods, and consisted of the appropriate number of standards. For the organics analyses, all percent relative standard deviation (%RSD) values were less than +/- 30% and all relative response factors (RRF) were greater than 0.05.

Continuing Calibration (CCALs)

All continuing calibrations were conducted according to the laboratory methods, and consisted of the appropriate number of standards. For the organics analyses, all percent difference (%D) values were less than +/- 25% and all relative response factors (RRF) were greater than 0.05, with the following exceptions:

SDG T055 (Volatiles). The %D value for trichlorofluoromethane was greater than the upper control limit of +25% in the CCAL analyzed on 9/30/11, exhibiting an instrumental high bias for this compound. There were no positive results for this target analyte in any of the associated samples. No further action was required.

The %D value for trichlorofluoromethane was greater than the upper control limit of +25% in the CCAL analyzed on 10/3/11, exhibiting an instrumental high bias for this compound. There were no positive results for this target analyte in any of the associated samples. No further action was required.

The %D values for trichlorofluoromethane, 2-butanone, and 4-methyl-2-pentanone were greater than the upper control limit of +25% in the CCAL analyzed on 10/4/11 (medium level analysis),

exhibiting an instrumental high bias for these compounds. There were no positive results for this target analyte in any of the associated samples. No further action was required.

SDG T055 (Semi-Volatiles). The %D value for 4-nitrophenol was greater than the upper control limit of +25% in the CCAL analyzed on 9/10/11, exhibiting an instrumental high bias for this compound. There were no positive results for this target analyte in any of the associated samples. No further action was required.

Reporting Limits and Miscellaneous

SDG T055 (Volatiles). The laboratory indicated that Sample TP-15-9-10 was analyzed at a medium level because of matrix interference. There were no positive detections in the sample. For this reason, several of the reporting limits were effectively raised to levels which are greater than the target reporting limits. No further action was taken other than to note this discrepancy.

SDG T055 (Semi-Volatiles). The laboratory indicated that the positive result for phenol in Sample TP-11-18-19 did not meet the appropriate spectral standards used for mass spectrometer instrumentation. For this reason, the phenol result was qualified as estimated (J) in this sample.

Overall Assessment

As was determined by this Stage 2B Validation, the laboratory followed the specified analytical methods. Accuracy was acceptable, as demonstrated by the surrogate, LCS/LCSD, and MS/MSD %R values, with the exceptions noted above. Precision was acceptable, as demonstrated by the field duplicate, laboratory duplicate, LCS/LCSD and MS/MSD RPD and absolute difference values, with the exceptions noted above.

Data were qualified as estimated because of field duplicate precision outliers and a low spectral match for phenol. Data were qualified as not detected for several analytes because of method and trip blank contamination. Additionally, the detection limits were greater than the target reporting limits in one sample due to matrix interference.

All data are acceptable for use as qualified.

TABLE B-1

CHEMICAL ANALYTICAL DATA FOR VOLATILE ORGANIC COMPOUNDS (VOCs) IN TRIP BLANKS

AVERY LANDING SITE

AVERY, IDAHO

	Sample ID	TRIP BLANK1_110920	TRIP BLANK2_110920
	Sample Date	9/20/2011	9/20/2011
Analyte	Unit		
1,1,1,2-Tetrachloroethane	µg/L	1.0 U	1.0 U
1,1,1-Trichloroethane	µg/L	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	µg/L	1.0 U	1.0 U
1,1,2-Trichloroethane	µg/L	1.0 U	1.0 U
1,1-Dichloroethane	µg/L	1.0 U	1.0 U
1,1-Dichloroethene	µg/L	1.0 U	1.0 U
1,1-Dichloropropene	µg/L	1.0 U	1.0 U
1,2,3-Trichlorobenzene	µg/L	5.0 U	5.0 U
1,2,3-Trichloropropane	µg/L	2.0 U	2.0 U
1,2,4-Trichlorobenzene	µg/L	5.0 U	5.0 U
1,2,4-Trimethylbenzene	µg/L	1.0 U	1.0 U
1,2-Dibromo-3-Chloropropane	µg/L	5.0 U	5.0 U
1,2-Dichlorobenzene	µg/L	1.0 U	1.0 U
1,2-Dichloroethane	µg/L	1.0 U	1.0 U
1,2-Dichloropropane	µg/L	1.0 U	1.0 U
1,3,5-Trimethylbenzene	µg/L	1.0 U	1.0 U
1,3-Dichlorobenzene	µg/L	1.0 U	1.0 U
1,3-Dichloropropane	µg/L	5.0 U	5.0 U
1,4-Dichlorobenzene	µg/L	1.0 U	1.0 U
2,2-Dichloropropane	µg/L	1.0 U	1.0 U
2-Butanone	µg/L	5.0 U	5.0 U
2-Chloroethylvinylether	µg/L	5.0 U	5.0 U
2-Chlorotoluene	µg/L	1.0 U	1.0 U
2-Hexanone	µg/L	5.0 U	5.0 U
4-Chlorotoluene	µg/L	1.0 U	1.0 U
4-Methyl-2-Pentanone (Methyl isobutyl ketone)	µg/L	5.0 U	5.0 U
Acetone	µg/L	10 U	10 U
Acrolein	µg/L	10 U	10 U
Acrylonitrile	µg/L	5.0 U	5.0 U
Benzene	µg/L	1.0 U	1.0 U
Bromobenzene	µg/L	1.0 U	1.0 U
Bromochloromethane	µg/L	1.0 U	1.0 U
Bromoethane	µg/L	2.0 U	2.0 U
Bromoform	µg/L	1.0 U	1.0 U
Bromomethane	µg/L	1.0 U	1.0 U
Carbon Disulfide	µg/L	1.0 U	1.0 U
Carbon Tetrachloride	µg/L	1.0 U	1.0 U
CFC-113 (1,1,2 - Trichloro 1,2,2 trifluoroethane)	µg/L	2.0 U	2.0 U
Chlorobenzene	µg/L	1.0 U	1.0 U
Chloroethane	µg/L	1.0 U	1.0 U
Chloroform	µg/L	1.0 U	1.0 U
Chloromethane	µg/L	1.0 U	1.0 U
Cis-1,2-Dichloroethene	µg/L	1.0 U	1.0 U
Cis-1,3-Dichloropropene	µg/L	1.0 U	1.0 U
Dibromochloromethane	µg/L	1.0 U	1.0 U
Dibromomethane	µg/L	1.0 U	1.0 U
Dichlorobromomethane	µg/L	1.0 U	1.0 U
Ethylbenzene	µg/L	1.0 U	1.0 U
Ethylene dibromide	µg/L	1.0 U	1.0 U
Hexachlorobutadiene	µg/L	5.0 U	5.0 U
Isopropylbenzene (Cumene)	µg/L	1.0 U	1.0 U
Methyl Iodide	µg/L	1.0 U	1.0 U
Methylene Chloride	µg/L	**2.8**	**3.2**
Naphthalene	µg/L	5.0 U	5.0 U
n-Butylbenzene	µg/L	1.0 U	1.0 U
n-Propylbenzene	µg/L	1.0 U	1.0 U
p-Isopropyltoluene	µg/L	1.0 U	1.0 U
Sec-Butylbenzene	µg/L	1.0 U	1.0 U
Styrene	µg/L	1.0 U	1.0 U
Tert-Butylbenzene	µg/L	1.0 U	1.0 U
Tetrachloroethene	µg/L	1.0 U	1.0 U
Toluene	µg/L	1.0 U	1.0 U
Trans-1,2-Dichloroethene	µg/L	1.0 U	1.0 U
Trans-1,3-Dichloropropene	µg/L	1.0 U	1.0 U
Trans-1,4-Dichloro-2-butene	µg/L	5.0 U	5.0 U
Trichloroethene	µg/L	1.0 U	1.0 U
Trichlorofluoromethane (CFC-11)	µg/L	1.0 U	1.0 U
Vinyl Acetate	µg/L	5.0 U	5.0 U
Vinyl Chloride	µg/L	1.0 U	1.0 U
Xylene, m-,p-	µg/L	2.0 U	2.0 U
Xylene, o-	µg/L	1.0 U	1.0 U

Notes:

U = The analyte was not detected at a concentration greater than the identified reporting limit.

Bold indicates analyte was detected

APPENDIX C
Well Decommissioning Records

Form 238(4)-2
2/04

ID NUMBER _____

State of Idaho Department of Water Resources

AUTHORIZATION TO ABANDON A WELL

1. **WELL OWNER INFORMATION:**
Date 9/21/11 Phone Number _____
Name Potlatch Corporation
Mailing Address P.O. Box 386
City St. Maries State ID Zip Code 8383 83861

2. **WELL LOCATION:**
Township: 45N Range: 05 E Section: 16 1/4 SE 1/4 SE 1/4
Gov't Lot No. _____ County Shoshone
Street Address of well site: Mile Marker 46
City Avery Lot Block Subdivision Name: _____
GPS Location: Lat: _____ Long: _____

3. **TYPE OF WELL:**
[ ] DOMESTIC [ ] MONITORING [ ] IRRIGATION [X] OTHER Commercial Logging
(Describe)

4. **WELL INFORMATION:** (Well depth, measured, casing size & static water level required)
Well Tag Number: N/A
Previous Drilling Permit Number: _____
Water Right Number: _____ - _____
Well Log on File? [X] Yes [ ] No
*Casing Size: 6" *Material: Steel
Temperature: [X]<85°F [ ]>85°F Flowing Artesian? [ ]Yes [X] No
*Static Water Level: _____ (measured) * Well Depth 67' (measured)

5. **REASON FOR ABANDONMENT OF WELL**
No Longer in use

6. **PROPOSED METHOD OF ABANDONMENT:**
(This Application must be reviewed prior to commencement of abandonment)
Perforate casing, fill to top with Bentonite grout / slurry

7. **Drilling Company proposing abandonment** H2O Well Service Inc.
8. **License Number** 448 **Date of abandonment** 9/21/11
9. **APPLICANTS SIGNATURE** _____ **DATE:** 9/21/11
Title Owner
(Owner, Firm Representative, Other)

Keith L. Franklin

Int. Project Mng.

Form 238-7
6/07

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D _____

Drilling Permit No. _____

Water right or injection well # _____

2. OWNER: Potlatch Corporation

Name _____

Address P.O. Box 386

City St. Maries State ID Zip 83861

3.WELL LOCATION:

Twp. 45 North ☒ or South ☐ Rge. 05 East ☒ or West ☐

Sec. 16 ____ 1/4 (10 acres) SE 1/4 (40 acres) SE 1/4 (160 acres)

Gov't Lot _____ County Shoshone

Lat. 47 ° 14. 962 (Deg. and Decimal minutes)

Long. 115 ° 49. 388 (Deg. and Decimal minutes)

Address of Well Site Mile Marker 46

(Give at least name of road + Distance to Road or Landmark) City Avery

Lot. _____ Blk. _____ Sub. Name _____

4. USE:

☐ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation ☐ Thermal ☐ Injection
☒ Other Commercial Logging

5. TYPE OF WORK:

☐ New well ☐ Replacement well ☐ Modify existing well
☒ Abandonment ☐ Other _____

6. DRILL METHOD:

☒ Air Rotary ☐ Mud Rotary ☐ Cable ☐ Other _____

7. SEALING PROCEDURES:

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Was drive shoe used? ☐ Y ☒ N Shoe Depth(s) _____

9. PERFORATIONS/SCREENS:

Perforations ☒ Y ☐ N Method Perforator

Manufactured screen ☐ Y ☒ N Type _____

Method of installation _____

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule

Length of Headpipe _____ Length of Tailpipe _____

Packer ☐ Y ☒ N Type _____

10.FILTER PACK:

Filter Material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method

11. FLOWING ARTESIAN:

Flowing Artesian? ☐ Y ☒ N Artesian Pressure (PSIG) _____

Describe control device _____

12. STATIC WATER LEVEL and WELL TESTS:

Depth first water encountered (ft) N/A Static water level (ft) N/A

Water temp. (°F) N/A Bottom hole temp. (°F) N/A

Describe access port _____

Well test:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)
	0	

Test method:

Pump	Bailer	Air	Flowing artesian
☐	☐	☐	☐
☐	☐	☐	☐

Water quality test or comments: _____

13. LITHOLOGIC LOG and/or repairs or abandonment:

Bore Dia. (in)	From (ft)	To (ft)	Remarks, lithology or description of repairs or abandonment, water temp.	Water Y	Water N
			Cut Casing off -3'		
			Perforated 60' of casing		
			Filled with Bentonite Grout		
			to -3' Topped with Hole Plug		

Completed Depth (Measurable): 0

Date Started: 9/21/2011 Date Completed: 9/21/2011

14. DRILLER'S CERTIFICATION:

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name H2O Well Service Inc. Co. No. 448

*Principal Driller Tom Robertson Date 9-22-11

*Driller _____ Date _____

*Operator II _____ Date _____

Operator I _____ Date _____

*** Signature of Principal Driller and rig operator are required.**